

MAPPING STATISTICAL DATA: POSSIBILITIES OF EUROSTAT-MAP.JS LIBRARY

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ABSTRACT:

Access, availability, and general interest in open data have increased significantly over the past decade. Open data can be published by various organizations and individuals, with public organizations being the largest producers of open data. Despite governments' efforts to publish a large number of high value datasets on open data portals, data reuse is still not satisfactory because users often lack the technical skills required to reuse data. Research has shown that providing open-source software and tools can help solve this problem. Since statistical datasets are among the high-value datasets and their visualization on a map can help in decision-making, this research explores the possibilities of using the Eurostat-map.js library, a novel JavaScript tool, to enable non-specialized users (e.g., researchers, journalists, and citizens) to use Eurostat statistical data to create thematic maps. By analysing use cases that utilize the Eurostat-map.js library and exploring cartographic principles and techniques available for mapping official statistical data, this research addresses its capabilities, limitations, and opportunities for future development. Although the eurostat-map.js library aims to provide a user-friendly approach, it is important to note that non-specialist users may still face challenges in using the library due to their limited technical and cartographic expertise. Creating maps and effectively visualizing Eurostat data requires a certain level of technical skills and cartographic knowledge. Non-specialist users, such as researchers, statisticians, journalists, and government agency personnel, who do not have extensive experience in programming or cartography, may find it more difficult to use the library than specialists in these fields.

1. INTRODUCTION

In today's technologically advanced world, data has emerged as a critical resource that holds great potential for societal and economic development. Recognizing the advantages of opening data to society, numerous initiatives and organizations have made efforts to ensure its wide accessibility and availability. The term open data, according to the Open Knowledge Foundation can be used to describe all "data that's freely used, modified, and shared by anyone and for any purpose" (James, 2013). The access, availability, and overall interest in open data, has significantly grown in the last decade (Welle Donker and van Loenen, 2017). Although open data does not necessarily have to be collected and published by the government, public organizations are among the largest producers of open data (Janssen, 2012).

Within the European Union, the responsibility for collecting and storing substantial amounts of data lies with public agencies, and the European Commission has played a leading role in opening data in the region. The European Union has recognized the potential and value that data and data solutions generate and has therefore developed strategies leading to simpler data accessibility and reuse.

Among the various thematic categories of high-value datasets identified by the European Commission, statistics encompass a wide range of valuable datasets, including population, fertility, mortality, poverty, employment, and government expenditure. The availability of statistical data in an open and accessible format has the potential to involve various stakeholders in the development of new solutions and products, extending beyond policymakers to researchers, journalists, and citizens (Kalampokis et al, 2016).

However, despite the increasing availability of open statistical data, their reuse by general users still faces challenges primarily due to limited technical capabilities. To address this problem, tools and platforms are needed that allow both specialised researchers and a more general audience to effectively use statistical data. In this research, we aim to explore the possibilities of using the Eurostat-map.js library, a novel JavaScript tool, to enable non-specialised users to create thematic maps based on Eurostat statistical data.

The Eurostat-map.js library, developed in 2019, allows its users to generate custom interactive web maps based on the Nomenclature of territorial units for statistics regions - NUTS (Gaffuri et al., 2019). The library offers users the flexibility to upload their own CSV files or retrieve data directly from the Eurostat database. By combining the D3.js, an open-source JavaScript library with TopoJSON, Eurostat-map.js enables the dynamic display of statistical data on web maps.

The primary objective of this research is to comprehensively explore and evaluate the potential applications and benefits of the Eurostat-map.js library in generating customizable, interactive web maps based on NUTS regions. By analysing available use cases that utilise the Eurostat-map.js library, this research will showcase its capabilities but also identify limitations and opportunities for future development. Ultimately, this research aims to contribute to the broader goal of harnessing the power of open data for informed decision-making and societal progress.

2. BACKGROUND

This section demonstrates the importance of open data initiatives, particularly in the context of statistical data, and highlights the

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role of cartography and potential of mapping libraries for geospatial data visualization.

2.1 Open Statistics as High Value Datasets

Data published by the government is referred as Open Government Data or Public Sector Information (PSI), if the following eight principles for open data are met: complete, primary, timely, accessible, machine processable, non-discriminatory, non-proprietary and license-free (Tauberer, 2014).

Through the 2003 PSI Directive, the European Commission set up a legal framework for publishing data in the European Union. The focus of the PSI Directive was on the economic aspect of reusing open data, so it was necessary to strengthen the principles of openness, interoperability and accessibility. The PSI Directive was therefore reviewed and replaced in 2019 with the Directive on open data and the re-use of public sector information (Directive (EU) 2019/1024). The new Open Data Directive has recognized the existence of datasets whose reuse is associated with greater socioeconomic benefits that have high value. An important part of this new, revised open data directive is a list of thematic categories of “high-value datasets”. These datasets, which are of high value to the economy and society, should be published via APIs and accessible to everyone free of charge and with minimal legal restrictions.

In the 2019 Open data directive, the thematic scope of six categories of high-value datasets was defined: geospatial; earth observation and environment; meteorological; statistics; companies and company ownership; and mobility. The complete list of specific high-value datasets and the arrangements for the publication and reuse were published recently, in the Commission’s 2022 Implementing Regulation (Regulation (EU) 2023/138).

Another important strategy related to open data and data reuse that needs to be mentioned is the European Data Strategy (Communication (EU) 2020/66 final) and its main pillar – the Data Governance Act (Regulation (EU) 2022/868), which will apply from September 2023 after a 15-month grace period. These initiatives aim to create an open, data-driven environment and a trusted, reliable, and interoperable market where data can flow within the EU and across different sectors, benefiting private companies, public organizations and researchers.

As statistical datasets have been recognized as high-value datasets, their reuse can bring numerous economic and societal benefits. Some of the datasets that have been identified as high-value datasets within statistics are: Population, Employment, Mortality, Poverty, etc. Kalampokis et al. (2016) refer to these data as Open Statistical Data (OSD) and introduce Open Statistics as a new field to study OSD and the value it creates. Open Statistics introduce two types of OSD exploitation: problem-driven and data-driven approach, allowing easier discovery and analysis of OSD as well as identifying relationships between different datasets. This approach provides the opportunity to include different *producers*, i.e., people that consume as well as produce information (e.g., statisticians, researchers, journalists, citizens), in the process of designing new statistical products (Gaffuri et al., 2019).

By opening statistical data specifically, opportunities emerge for researchers, journalists, and citizens to explore and analyse data in novel ways, contributing to data-driven insights and solutions.

2.2 Challenges in Reusing Open Statistical Data

Existing research (e.g., Welle Donker and van Loenen, 2017) has already highlighted the socio-economic benefits of open data, including enhanced transparency, accountability, innovation, and economic growth. Studies have shown how open data can contribute to evidence-based policymaking, enabling governments and policymakers to make informed decisions and facilitate citizen engagement (Purwanto et al., 2020). Moreover, open data has been instrumental in driving entrepreneurship and the development of new services and businesses (Olesk et al., 2017).

Despite the increasing availability of open statistical data, challenges persist in its reuse, particularly for non-specialist users. Limited technical skills and data literacy often act as barriers to effectively harnessing the potential of open statistical data. Research (Gosh et al. 2017) has highlighted the need for user-friendly tools and platforms that facilitate data exploration and visualization, enabling non-experts to derive meaningful insights.

2.3 The Role of Mapping Libraries in Data Visualization

Data visualization plays a crucial role in making complex datasets more accessible and understandable. Mapping libraries have emerged as valuable tools for visualizing geospatial data, including statistical information. These libraries provide functionalities to create interactive and customizable maps, facilitating the exploration and communication of data in a geospatial context.

Studies (Smith, 2016) have explored the use of various mapping libraries, such as Leaflet, D3.js, and Mapbox, in visualizing statistical data. These libraries offer capabilities to integrate data with map layers, apply thematic colour schemes, and provide interactive features for users. Research has shown the effectiveness of mapping libraries in conveying statistical information, enabling users to discern spatial patterns, trends, and relationships (Smith, 2016).

2.4 Online interactive mapping for visualization of statistical data

Cartography is a common tool in scientific research, and its role changes depending on the phase of research in which it is used (Smith, 2016). The use of cartography in the early stages of the research process, during the assessment of data, supports visual thinking (DiBiase, 1990), which then leads to a better understanding of the data and better-formulated research questions and hypotheses. According to MacEachren (1994), such exploratory mapping “uncovers the unknown” and often relies on a high degree of interaction with the user. In contrast, cartography used in the later stages of the research process often aims to convey a message, i.e., to provide visual communication (DiBiase, 1990). When characterized as visual communication, cartography becomes a means by which researchers present their findings to the public. MacEachren (1994) describes this explanatory cartography as “presenting knowns” and relates it to low map interaction functionalities.

With its ability to reach large audiences, online mapping can easily serve the presentation purposes of cartography in the context of disseminating results. However, it is necessary to provide interactive online mapping functionalities to achieve the exploratory level of cartography, which is closely related to user engagement (Smith, 2016). Technological innovations are

constantly challenging existing limitations and opening up new possibilities, so today there exist interactive online tools that provide both presentation and exploration capabilities, thus meeting the requirements for widespread accessibility and interactivity. These capabilities find application in specific research processes. For instance, Smith (2016) describes an example of exploring a large data set with complex variables whose visualization needs exceed the capabilities of traditional presentation cartography.

The problem of ever-increasing data volumes is placing new demands on users, who are now looking for efficient solutions for navigating large and complex data sets. By allowing users to preview and interpret data from a spatial perspective, online interactive mapping has the potential to alleviate this problem (Smith, 2016). In addition, online mapping tools today also offer the possibility of analytical data processing (visual analytics). Data mining based on relatively easy-to-use interactive map visualizations is very beneficial in various areas of human activity (e.g., decision making), as the range of potential users expands beyond the usual target groups. In this way, even non-experts can engage with and understand the data (Smith, 2016).

The presence of cartography in modern research processes brings new challenges. One of the biggest challenges is the development of mapping tools whose functionalities meet the needs of both experts and the general public (Smith, 2016). Another challenge is the cost associated with developing interactive online tools, the development of which requires IT, cartography, and design skills. The academic community can be highly appreciated in these processes and can also help bridge the gap between modern technology and the general public. Because it has resources to explore new online tools, it can help the public realize the potential of open data.

2.5 Assessment of Stakeholders Needs for Visualization of Open Government Statistical Data

Cartographic visualization can help stakeholders better engage with open data, but not all stakeholders have the same expectations for cartography, nor the skills needed to create high-quality visualizations. The diversity of stakeholder groups interested in open data and their specific needs have led to increased research interest in this topic, which should lead to more appropriate visualization solutions. As described in Ansari et al. (2022), stakeholders can be classified in many ways, from a more generic approach such as a general user profile to a more specific one such as political intermediary groups. Regardless of classification, there are still limitations, such as user data visualization capabilities, that prevent full reuse of open data. Based on a survey in which they characterized different user profiles and work experiences, Graves and Hendler (2013) propose a set of five general requirements for open data visualization tools that can also be applied to the statistical data domain. For open statistical data visualization tools to be widely used (i.e., used by all possible stakeholders), they must simplify the process of creating visualizations and be easy to use.

This includes the creation of preliminary visualizations, where the visualization is created with a few clicks and later debugged and extended if necessary. As part of the second requirement, the authors suggest implementing mechanisms that provide users with additional information about the data and sources used to create the visualizations. It seems that stakeholders are very interested in learning more about the background of the data used in the visualization and the visualization itself. The third

requirement relates to the ability of the visualization tool to facilitate communication between data users and providers. For many stakeholders, the meaning of the data or the data structure may not be clear, so communication mechanisms with data providers, such as feedback or contact information, should contribute to a better common understanding of the available data and consequently to better quality statistical data. Graves and Hendler (2013) also point out that public sharing of visualizations should not be de-emphasized. Dissemination of the visualization after it has been created is important to achieve social impact, so attention should be paid to sharing mechanisms that must be simple and easy to use. This is especially important for statistical data visualization since statistical data usually provide insight into events, so their broad accessibility can mean a more informed public. Finally, it is sometimes necessary to create a revised version of a visualization created by a third party. Visualization tools should therefore allow for deconstruction, modification, and creation of new visualizations, but also record metadata changes to provide accurate lineage information.

The proposed requirements for open data visualization tools aim to achieve better stakeholder engagement with open data visualization. Easy-to-use visualization tools that allow the creation, modification, and dissemination of visualizations while ensuring communication between stakeholders and the provision of metadata are of great benefit to stakeholders interested in open statistical data. In this way, more stakeholders could be engaged in the process of liberating information stored in open statistical data.

3. EUROSTAT-MAP.JS LIBRARY: EXPLORING THE POTENTIAL IN THE CREATION OF THEMATIC MAPS

3.1 Eurostat data and Eurostat-map.js

Eurostat is the statistical office of the European Union responsible for providing high-quality statistical datasets on Europe, that's collected in partnership with National Statistical Institutes and other national authorities in the EU Member States. These datasets are provided free of charge, in machine-readable format and can be accessible via APIs, all in accordance with the 2019 Open Data Directive (Directive (EU) 2019/1024).

Various tools and software have been introduced to facilitate the reuse of Eurostat data. The use of these do-it-yourself services allows citizens and private organizations to gain meaningful insights, explore patterns, and discover existing problems when using open statistical data (Gaffuri et al., 2019). Eurostat-map.js library is an example of such a do-it-yourself service.

3.2 Eurostat-map.js and technology behind

Eurostat-map.js (Gaffuri and Davies, 2018) is an open-source JavaScript library that allows its users to create and customize different types of web maps based on Nomenclature of Territorial Units for Statistics (*fr.* Nomenclature des Unités territoriales statistiques, NUTS), on various platforms (e.g., Observable notebook). Eurostat data can be retrieved directly "on-the-fly" from Eurostat database using Eurostat REST API. By using Eurostat REST API, users can directly access reliable and official datasets, ensuring that the data used is always up to date.

The mapping of socio-economic statistical open data requires datasets to be matched with geospatial geometry data, principally administrative zone boundaries. The Nomenclature of territorial units for statistics (NUTS) is a geographical nomenclature subdividing the economic territory of the European Union (EU)

into regions at three different levels (NUTS 1, 2 and 3 respectively, moving from larger to smaller territorial units). The NUTS is based on Regulation (EC) No 1059/2003 of the European Parliament and of the Council of 26 May 2003 on the establishment of a common classification of territorial units for statistics (NUTS), which is regularly updated.

The NUTS regions, on which the maps are based, are used to divide the economic territory of the European Union into territorial units for the production of regional statistics and include 92 regions at the NUTS 1 level ('national' level of the Member States), 242 regions at the NUTS 2 level, and 1166 regions at the NUTS 3 level (European Commission, Eurostat, 2022). In Eurostat-map.js library NUTS regions rely on Nuts2json API, that provides its geometries in TopoJSON and GeoJSON web formats. Final maps are being rendered as SVG using D3.js library.

3.3 Cartographic principles and techniques implemented for mapping statistical data

The library provides different map design possibilities that can help with visual exploration of statistical data. These possibilities facilitate and speed up the process of map creation by guiding the user how to create a map according to cartographic principles. Users can select different map types, different statistical data sources, and map elements to be displayed on a map. Eurostat-map.js offers its users the ability to create seven different types of maps: Choropleth, Proportional Symbol, Proportional Pie Chart, Categorical, Bivariate Choropleth, Strip Composition and Sparkline map. The map can also be customized using various methods (e.g., map height, width, specification of NUTS geometries and the geographical extent of the map, map scale, map projection). When it comes to spatial coverage, it is possible to create thematic world maps, not only maps for the European continent.

Users can set the fill color for territories, the stroke color and width for states and coastal borders, as well as adjusting the map projection. Several types of data sources are supported: statistical data can be retrieved on-the-fly from the Eurostat database, from CSV data and even specified by the region using JavaScript code, or any type of JSON data source.

Users can also specify a color scheme that will be used to display data on the map. By using d3 scale-chromatic module it is possible to select between sequential, diverging, and categorical colour schemes, with most of them deriving from ColorBrewer. ColorBrewer is a program developed by Cynthia Brewer in 2003 to help novice map designers in the selection of appropriate color scheme and has been widely recommended by the cartographic literature (Slocum et al., 2022). The data can also be displayed with patterns instead of colors, which is a good option if the map is to be created for people with visual impairments, such as colour-blind people.

Eurostat-map.js also enables its users to modify elements like map title (its style and position), map frame (color of the frame and stroke width), map legend, scalebar, tooltip that's responsible for showing information on the map by moving the pointer on the screen (its style and content). It is also possible to specify different map styles (e.g., fill style of selected NUTS regions and country areas, stroke style and width of country boundaries, fill style of seas areas, stroke style and width of meridian and parallel lines), labels for country names and seas (e.g., colors, opacity, shadows, types of labels), insets showing overseas territories and small countries, bottom text, and link to source data.

4. PRESENTATION OF THE CASE STUDIES UTILIZING THE EUROSTAT-MAP.JS LIBRARY

In this chapter, we describe existing use cases that demonstrate the diversity of possibilities of the Eurostat-map.js library, all available in the GitHub repository (Gaffuri and Davies, 2018). Eurostat-map.js is an open-source library available under an open license so the community of developers can contribute to the code, fix bugs, and improve the library over time. Users can freely access, use, modify, and redistribute the library's source code according to the terms of the open-source license. Not only is the library's documentation available, but there are examples of how to use the library, with the code openly available to anyone.

According to (Slocum et al., 2022) there are four common thematic mapping techniques: choropleth, proportional symbol, isopleth and dot. Four use cases were selected for this analysis, and since the choropleth technique is one of the most commonly used mapping techniques in cartography, we selected use cases based on this technique. To show the variety and diversity of options available using the Eurostat-map.js library, we have analysed use cases that display choropleth maps with different geographic focus (showing a specific region in Europe, showing entire Europe, and a world map). Since all use cases are available under an open licence, we had no trouble analysing their source code to explore their capabilities.

4.1 Choropleth map

The first use case (Figure 1) shows the population in Europe on a choropleth map (URL1). A choropleth map is a type of thematic map used to represent data collected for census units (e.g., countries, regions), and usually shows variables such as population, income, poverty rate, employment, age distribution etc. However, when using them, it is important to consider data standardization, in which raw totals are adjusted to fit the different sizes of census units (Slocum et al. 2022).

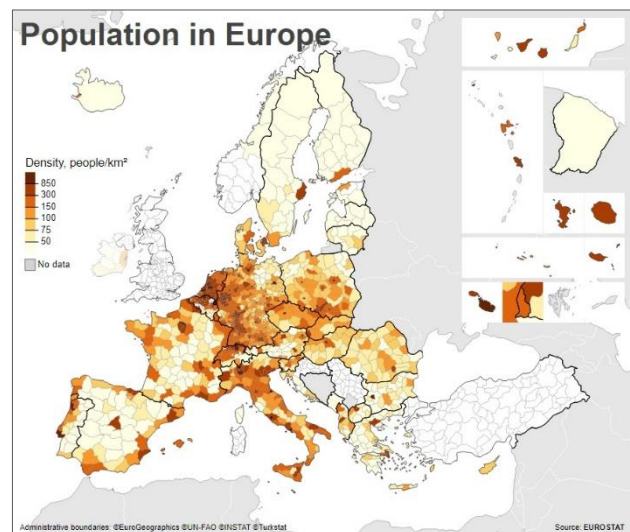


Figure 1. Population density in Europe (the number of people per km² of land area) depicted on a choropleth map.

Choropleth map is a suitable form of representation when the variables that need to be represented change across different regions. In the process of making choropleth maps, data classification plays an important role. Data classification is used

to minimize the number of colours needed to present the data, as well as minimizing the subjectivity of data representation (Andrienko et al., 2001). On choropleth maps, data is divided into classes, with a different hue assigned to each class. There are several classifications methods that can be used to classify data on choropleth maps, e.g. Natural Breaks (Jenks) classification, equal interval data classification, quantile, manual. In Eurostat-map.js, when using the method `map.classifMethod([value])`, it is possible to classify data into “quantile” and “equinter” for equal intervals and “threshold” for user-defined thresholds. The Lambert Azimuthal Equal Area map projection was correctly used for statistical mapping where true area representation is required.

The first map shows the population density (people/km²) in Europe by NUTS3 regions in 1:20M scale. The version of NUTS3 regions is from 2016. The map has a title with defined font and fill size, while data is retrieved directly from the Eurostat database via REST API. Data is classified using the “threshold” method, and there are overall seven data classes. The map code also shows that the position of the legend on a map and its size are fixed. Even though there is an option to choose a colour scheme, in this example the predefined one is assigned.

4.2 Bivariate Choropleth map

The next use case (Figure 2) shows unemployment and population density in Europe, on a bivariate choropleth map (URL2). A bivariate choropleth map is a type of choropleth map that shows two variables at once. It combines two attributes (numerical datasets) into a single map, to show how these two attributes change in relation to each other and in space. Unemployment is given as a percentage of the population, and population density as the number of inhabitants per square kilometre. This map also has a title with defined font and fill size, and both datasets are retrieved directly from the Eurostat database.

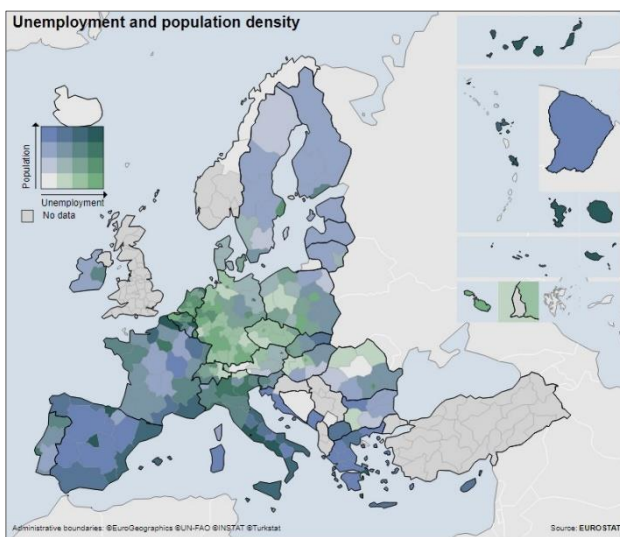


Figure 2. Unemployment and population density in Europe on a bivariate choropleth map

Map scale is 1:60M, while NUTS2 level, 2016 version was chosen to be shown on the map in Lambert Azimuthal Equal Area map projection. The code of the map also shows that the fill style of the sea area was defined, however, graticules (parallels and

meridians) are not displayed. In Eurostat-map.js library for bivariate choropleth maps, there are options to change the legend parameters (e.g., size of the legend square, text labels for displayed variables, font size, show/hide “no data” style in the legend). In this example, 80 pixels are selected for the size of the legend square, while the variable labels *Unemployment* and *Population* are displayed on a X and Y axis.

4.3 World map

The third use case (URL3) shown on Figure 3 is also an example of a choropleth map, but this time it shows the entire world to demonstrate that Eurostat-map.js library can also be used to create thematic world maps. World templates are currently only available for choropleth maps. The geographical territory is by default set to Europe, so the value “WORLD” is specified in the `the map.geo ([value])` method, while the cartographic projection used is the Robinson pseudocylindrical projection.

Since a custom data source was used that mixes different NUTS levels, the value “mixed” was set in the `map.nutsLvl([value])` method to display different levels at once. The map title “World Map” is displayed on a map, but there is no legend explaining what kind of data the map shows. Also, this is not apparent from the code itself, as one can only read the values attached to the country codes. The data on the map is classified according to the user-defined “threshold” method, and there are a total of eight data classes. For each of these classes, a user specified colour has been assigned. The graticule is also defined in the code to be displayed on the maps, as are the labels with the names of the seas and sea fill colour.

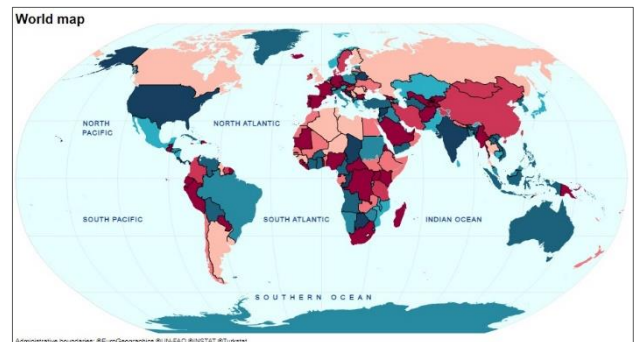


Figure 3. Choropleth map of world in Robinson projection.

4.4 Regional map

The next use case is another example of a choropleth map, now showing only a specific region with emphasis on Spain (URL4). On this map, presented in Figure 4, three D3 modules were used to create colour scale and colour scheme (hue): `d3-color`, `d3-interpolate` and `d3-scale-chromatic`. Sequential colour scheme was defined using `d3-scale-chromatic` module, `d3-color` was used for colour manipulation and `d3-interpolate` module was used to interpolate blue colour. The map has a title “Unemployment in Spain in 2019” with defined font and fill size, and dataset containing the rate of unemployment in Spain is retrieved directly from the Eurostat database.

The map scale is set to 1:10M, with NUTS2 level showing as boundaries. Since Spain is the centre of the map, the `map.geoCenter ([value])` method was used to set specific geographic coordinates to determine the centre, while `map.pixSize([value])` was used to determine zoom level of the

map. If these values are not specified, a position is automatically calculated, and the entire Europe extent is displayed. Labels showing the values of unemployment are also displayed on the map. Data is once again classified using the “threshold” method, and there are overall 11 data classes. The map code also shows that the national borders have a different stroke and width depending on the NUTS level, i.e., national state borders have a darker and wider stroke than regional state borders. The white colour was chosen to represent the seas on the map, while a medium, light shade of gray indicates the coastal edges. The `map.insets([values])` method was added to show Spain overseas territory, Canary Island, its size and position on the map.

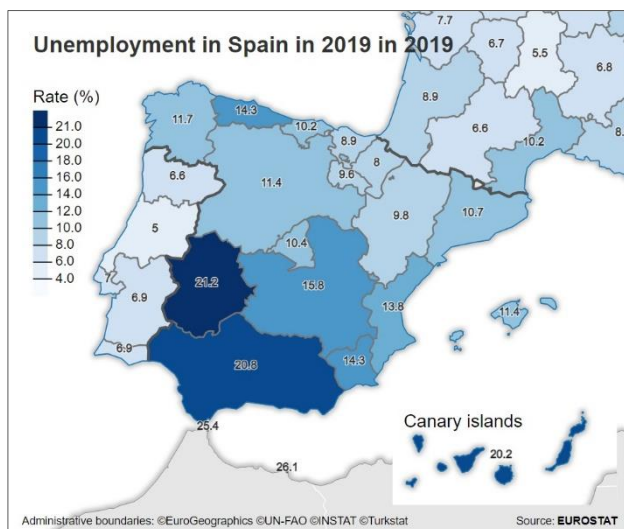


Figure 4. Unemployment in Spain in 2019 depicted on a choropleth map.

5. CONCLUSION

In conclusion, this research paper explores the Eurostat-map.js library and its potential in the creation of thematic maps using Eurostat data. Eurostat-map.js provides a user-friendly and customizable platform for users to visualize statistical data on interactive web maps.

The library leverages Eurostat's extensive dataset, allowing users to access and retrieve up-to-date information directly from the Eurostat database through the Eurostat REST API. This eliminates the need for manual data processing and ensures the maps reflect the latest available data.

Eurostat-map.js incorporates cartographic principles and techniques to guide users in creating visually appealing and informative maps. Users can choose from various map types, including choropleth, proportional symbol, and categorical maps, and customize elements such as colour schemes, legends, tooltips, and map styles. The library's flexibility enables users to create maps at different geographic scales, from regional to global.

Use cases presented in the research paper demonstrate the versatility of Eurostat-map.js, showcasing choropleth and bivariate choropleth maps depicting population density, unemployment rates, and other socio-economic variables. These examples highlight the library's capabilities in representing data effectively and providing insights into regional patterns.

While Eurostat-map.js aims to be accessible to non-specialist users, it is important to note that basic knowledge of HTML, CSS and JavaScript, may be required. In addition, cartographic non-specialists must also consider basic elements of cartographic literacy. This literacy does not only involve knowledge of cartographic alphabet (system of cartographic means of expression) and cartographic vocabulary, but also cartographic "syntax" (forms of cartographic expression) with corresponding cartographic "spelling and grammar" (standards and principles of cartographic representation).

However, the library's user-friendly features, documentation, and examples can still provide support and guidance for non-specialist users willing to invest time and effort in learning and applying the necessary skills. For example, predefined cartographic styles implemented in the library do not only support the user in the map design process, but also provide a user with a more secure design frame, where major pitfalls of cartographic design are avoided.

Overall, Eurostat-map.js contributes to the democratization of data visualization, enabling researchers, statisticians, journalists, and government agency personnel to present Eurostat data in a visually engaging and interactive manner. By facilitating the exploration and communication of statistical insights, the library supports informed decision-making, research, and public engagement.

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